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CLAIMS

2 I CLAIM:

3 1. A pharmaceutical composition, comprising a plurality of bone marrow stromal
4 cells (MSCs) comprising an adenovirus mediated human BMP-2 gene, and a pharmaceutically
5 acceptable polymer.

6 2. The composition as recited in Claim 1 wherein the polymer is selected from a
7 group consisting of alginate and collagen.

8 3. The composition as recited in Claim 1 wherein the MSCs are present in a
9 concentration of about 50×10^6 per ml of the polymer.

10 4. The composition as recited in Claim 1 wherein the polymer is Pancogene S.

11 5. A method of treating a bone or other tissue defect, comprising:
12 a. Obtaining a plurality of MSCs from a subject;
13 b. transferring a BMP-2 gene to the MSCs to form BMP-2 protein producing
14 MSCs; and
15 c. implanting the protein producing MSCs to a site on the subject.

16 6. The method as recited in Claim 5 wherein the BMP-2 gene is transferred via an
17 adenovirus.

18 7. The method as recited in Claim 5 further comprising mixing the BMP-2
19 producing MSCs with a polymer either before, during or after the implantation of the protein
20 producing MSCs.

1 8. The method as recited in Claim 5 wherein the protein producing MSCs implanted
2 are present in a concentration of about 50×10^6 per ml of a pharmaceutically acceptable polymer
3 and produce an effective amount of the protein.

4 9. A BMP-2 protein at a site of bone or other tissue defect produced by the method
5 of obtaining a plurality of MSCs from a subject, transferring a BMP-2 gene to the MSCs to form
6 BMP-2 protein producing MSCs, and implanting the protein producing MSCs to the site on the
7 subject.

8 10. The protein as recited in Claim 9 further comprising mixing the BMP-2 producing
9 MSCs with a polymer either before, during or after the time of implantation of the protein
10 producing MSCs.